



Food Safety Research Information Office

FSRIO

FOOD SAFETY RESEARCH: A FOCUS ON

AFLATOXIN CONTAMINATION

Aflatoxin contamination damages human health, animal health, the food supply, and world markets. Food safety researchers are actively searching for methods to control aflatoxin contamination in susceptible crops.

Classical plant disease prevention methods and routine technologies for controlling plant pathogens have generally been unsuccessful.

Cooperative efforts to establish control strategies began in 1988 with the start of the annual *Aflatoxin Elimination Workshop*. The published conference report is available at www.nal.usda.gov/fsrio/ppd/ars06.pdf.

FSRIO web site: A Resource for Aflatoxin Research Projects

For detailed information and descriptions of aflatoxin-related research projects, search the Food Safety Research database at www.nal.usda.gov/fsrio/fsresearch.htm.

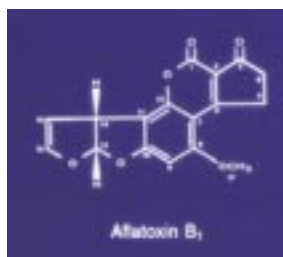
The ARS National Program 108 Food Safety Progress Report 2000, Section 12: Mycotoxins is available at www.nal.usda.gov/fsrio/ppd/ars05n.htm#12.26



From left to right: *Aspergillus flavus* conidiophore; Walnut Infected with *A. flavus*; Atoxigenic *A. flavus* biocontrol strain growing on kernels of wheat. Image Credits: ARS Southern Regional Research Center web site and the Cornell University Animal Science Department web site.

Aflatoxin Research Areas

- Fungal ecology and development of biological control agents
- Crop resistance through conventional breeding or genetic engineering techniques
- Crop management and fungal relationships
- Processing and new methods of sampling and toxin detection in crops
- Natural compounds that inhibit fungal growth and influence aflatoxin synthesis



The chemical structure of aflatoxin B₁.

GENERAL AFLATOXIN FACTS

Aflatoxins are naturally occurring toxins that are metabolic byproducts of fungi, *Aspergillus flavus*, and *Aspergillus parasiticus*, which grow on food and feed crops.

Conditions that contribute to fungal growth and the production of aflatoxins are: a hot and humid climate, kernel moisture of 13-20 percent, favorable substrate characteristics, and factors that decrease the host plant's immunity (insect damage, poor fertilization, and drought).

Food and food crops most prone to contamination are corn and corn products, cottonseed, peanuts and peanut products, tree nuts (pistachio nuts, pecans, walnuts, Brazil nuts), and milk.

The major types of Aflatoxins are B1, B2, G1, G2, and M1. Aflatoxin B1, a potent carcinogen to humans and animals, is the most toxic of its type.

Damage to animal and human health include acute toxicological effects such as liver damage and cancer.

Aflatoxins can invade the food supply at any time during production, processing, transport or storage.

Food and Drug Administration (FDA) action levels for aflatoxins present in human food is 20 ppb (parts per billion) with the exception of milk which is 0.5 ppb.

The Food and Agriculture Organization estimates 25 percent of the world's food crops are affected by mycotoxins.

AFLATOXIN RESOURCES

USDA/ARS Aflatoxin Collaborative Research Support Program (AF CRSP)

<http://msa.ars.usda.gov/la/srrc/aflatoxin/afcrsp.htm>

Aflatoxins: Occurrence and Health Risks. Cornell University Poisonous Plants Informational Database

<http://www.ansci.cornell.edu/plants/toxicagents/aflatoxin/aflatoxin.html>

Aflatoxins.

FDA Center for Food Safety & Applied Nutrition Foodborne Pathogenic Microorganisms and Natural Toxins Handbook

<http://vm.cfsan.fda.gov/~mow/chap41.html>

"Managing Aflatoxin in Corn"

Nutritional Insights: Vol.1 No. 1

Pioneer Hi-Bred International, Inc.

<http://www.pioneer.com/usa/nutrition/aflatoxin.htm>

Mycotoxins and Mycotoxicoses Web Site

Alabama A&M and Auburn Universities

Alabama Cooperative Extension System

<http://www.aces.edu/department/grain/ANR767.htm>

Aflatoxin Accumulation in Commercial Corn Hybrids in 1998

Gary L. Windham and W. Paul Williams
Research Report Vol. 22, No. 8.

<http://msucares.com/pubs/rr22,8.htm>

"Testing for Natural Aflatoxin Inhibitors"

Agricultural Research, July 1998.

<http://www.ars.usda.gov/is/AR/archive/jul98/afla0798.htm>

USDA/ARS National Center for Agricultural Utilization Research: Mycotoxin Research Unit

<http://www.ncaur.usda.gov/mtx/home.htm>

Society for Mycotoxin Research Germany

<http://www.mycotoxin.de/>

Mycotoxin Newsletter: International Union on Pure and Applied Chemistry (IUPAC)

<http://vm.cfsan.fda.gov/~frf/iupac.html>

USDA Grain Inspection, Packers and Stockyards Administration: Aflatoxin Backgrounder

<http://www.usda.gov/gipsa/newsroom/backgrounders/b-aflatox.htm>

Food Safety Research Information Office

10301 Baltimore Avenue, Room 113

Beltsville, MD 20705-2351

Voice: 301-504-7374

Fax: 301-504-6409

E-mail: fsrio@nal.usda.gov



The National Agricultural Library (NAL), the largest agricultural library in the world, has been serving agriculture since 1862. NAL was established by Congress as the primary agricultural information resource of the United States of America.

Visit the NAL web site at <http://www.nal.usda.gov>

The Food Safety Research Information Office (FSRIO) publicly launched its web site, www.nal.usda.gov/fsrio, on July 2, 2001, in support of the National Food Safety Initiative.

A key component of the web site is a database of food safety research projects. The database is a resource for researchers and administrators to assess food safety research needs and priorities, thereby minimizing duplication of effort. FSRIO was established in accordance with H.R. 2534 Agricultural Research, Extension and Education Reauthorization Act of 1997, SEC. 503.

This fact sheet was produced by Tara Smith, Information Specialist, and Yvette Alonso, Coordinator of the Food Safety Research Information Office at the National Agricultural Library, Agricultural Research Service, United States Department of Agriculture; February 2002.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD).

USDA is an equal opportunity provider and employer.